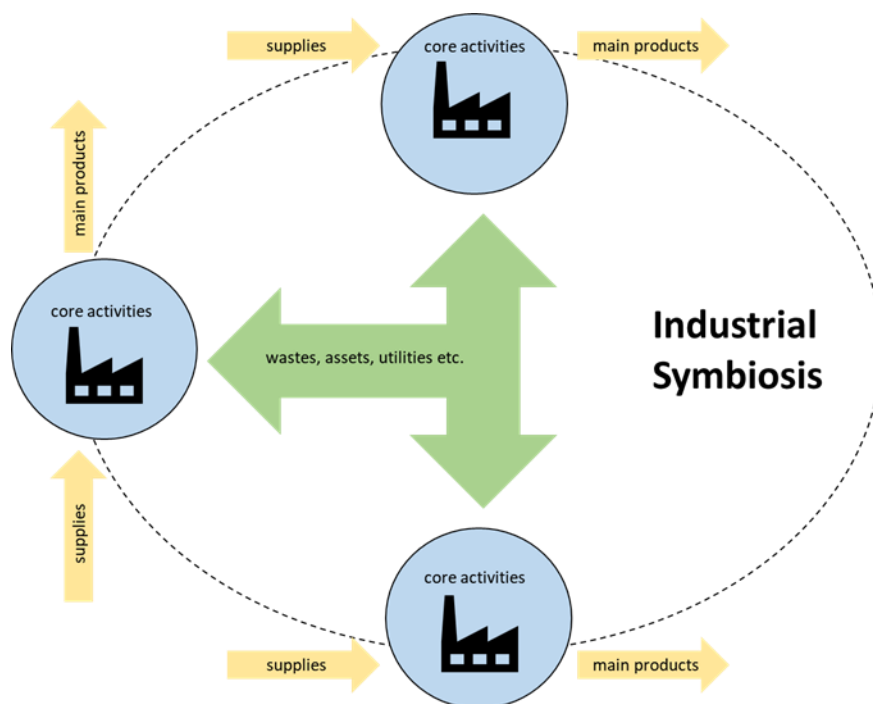


BEST PRACTICES – INDUSTRIAL SYMBIOSIS FACTSHEET



‘Sharing means saving’

United Kingdom
Agriculture

TRL 9

Investment (real or estimated)

0 €

Savings for crop farms

28 - 57 € per acre

Industrial symbiosis: asset sharing

Whether used or not, your assets have continuous costs: depreciation, financing and interest, maintenance. Making sure that the asset is always used to its maximum potential ensures that no money is wasted during downtime.

Other benefits

Easier access to large and modern machinery
Less material consumption

What is Industrial Symbiosis?

Industrial Symbiosis engages traditionally separate industries in a collective approach to competitive advantage involving physical exchange of materials, energy, water and by-products. The keys to industrial symbiosis are collaboration and the synergistic possibilities offered by geographic proximity. Industrial Symbiosis activity in Europe is very diverse in terms of features, emergence and

development patterns or the content of the transactions.

Examples of industrial symbiosis are wide ranging and include the use of waste heat from one industry to warm greenhouses for food production, the recovery of car tire shavings for use in construction materials, and the use of sludge from fish farms as agricultural fertilizer. Yet, collaborative strategies do not only include by-product synergy ("waste-to-feed" exchanges), they can also include wastewater

cascading, shared logistics and shipping/receiving facilities, green technology purchasing blocks, multi-partner green building retrofit or district energy systems. Proximity plays an important role in the feasibility of synergies, with most synergies happening in a radius of less than 50 km.

For example, industrial symbiosis has been applied for waste management and valorization in Lahti, Finland, and Pécs, Hungary¹.

1- https://ec.europa.eu/environment/europeangreencapital/wp-content/uploads/2018/05/Industrial_Symbiosis.pdf

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Sharing an asset with other

companies can be done when you are not using the asset for 100%. An asset can be anything that you use to make your business run.

An alternative to sharing currently owned assets is to invest in a new asset together with a partner. The combined investment will lower the investment costs per partner enabling investments, which would otherwise be out of reach.

When you share assets, you can more easily scale your business: rent out the assets if you are not using them, or access others spare

To get started with sharing, you can follow these steps:

1. Make an inventory of chances for asset sharing
2. Acknowledge and quantify under-used assets
3. Develop sharing policy and appoint someone to manage this task
4. Make an inventory of supply and demand
5. Use online marketplace or set up ad-hoc partnerships
6. Integrate sharing of assets in your company culture and daily operations

capacity when you need it.

Trust is essential in the sharing economy. Maybe you do not want to share your important assets - either because the other party is a competitor, because your equipment is so specific that there is no need for it by others, or because your assets are sensitive to disruptions or changed operating parameters. Two

approaches are available:

Find non-critical assets to share so you need less trust or make use of an online sharing platform where users are verifiable and can be rated.

A symbiotic partnership is effectively the opportunistic coming together of two or more actors from sectors that, under normal circumstances, would not come into contact.

Key benefits

Collective arrangements for expensive assets help to share the costs of capital and depreciation.

Efficiencies are also made through access to more modern and larger machinery that would otherwise be out of reach for the small to medium companies.

A secondary benefit of sharing assets is in the environmental gains. If two businesses can share the same asset to avoid the purchase of a second asset, less material is consumed.

Sharing agricultural equipment

The advanced machinery that farms need to boost competitive advantage is often costly to buy and maintain, especially for smaller operators. This is why the sharing economy is an ideal option. Digital technology and online platforms make this exchange of assets much more efficient and regulated.

Sharing the equipment can be done in different ways. Neighboring farms can buy machinery together and split the costs equally or on a pay-per-use basis. During the asset's lifetime, it is important to agree on conditions for using the machinery and things like maintenance and general care, and what happens when a user damages the machinery. This requires careful planning. In cases where no solution can be found for the specific tool, more generic equipment such as forklifts, loaders and trailers can still be shared. Farms can also pool resources, which includes labor and even non-farm assets. Labor and machinery savings for crop farms, for instance, have been estimated at between 28 € and 57 € per acre.

Logistics pooling can help companies to maximise loads and minimize the number of trips and distance travelled, resulting in lower overall transport (fuel, maintenance) and personnel costs.

According to Eurostat, 25 % of truck kilometers in EU countries run empty. For example, in the UK food supply chain only 52 % of the available space on loaded trips is used. Larger trucks, which can carry a payload of up to 29 tonnes, transport on average only 17.6 tonnes when loaded and 12.7 tonnes if empty running is allowed.

These statistics show that there is plenty of room for improvement, in many sectors. Multi-mode partnerships aimed at maximizing capacity (on outbound and return

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trips) can accomplish the following results:

- Reduce costs by 15 %
- Cut carbon emissions by as much as 50 %
- Improve delivery frequency by a factor 2 to 5
- Reduce stock levels by 15-20 %

Additionally, enterprise management and operations can focus on core business. Pooling requires more planning than traditional logistics. However, with the emergence of smart online applications, this task can be performed by so-called 3rd or

4th party logistics providers (3PL or 4PL). These services can bundle multiple, higher-volume shipments from different origins, making multi-mode transportation (train, ship, truck) accessible to even SMEs who would otherwise struggle to reach the scale required.

Opportunities and barriers to implementation

<i>Opportunities</i>	<i>Barriers</i>
Lower the investment costs per partner by combined investment	Pooling requires more planning

Access to more modern and larger machinery	Diverging priorities of various actors
Possibility for optimized waste management (less material waste)	
Pooling of resources (labour, machinery, transportation) reduces costs and boosts competitive advantage	

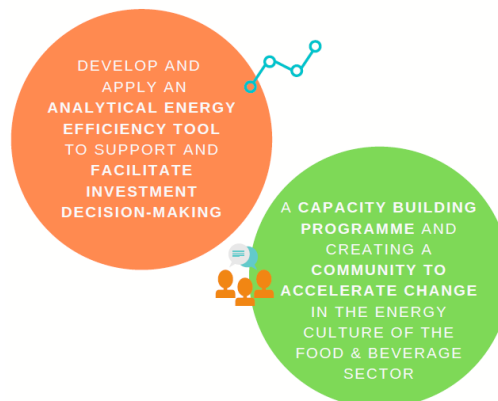
References

- [1] European Green Capital Award, Industrial Symbiosis.
- [2] Publications Office of the European Union, Study and portfolio review of projects on industrial symbiosis in DG research and innovation. 2019.

About ICCEE

The project www.iccee.eu, funded by the EU programme Horizon 2020, aims at improving energy efficiency in the cold chain of the food & beverage sector and making it easier for the sector to undertake energy efficiency measures across the entire supply chain and accelerate the implementation of energy audit results.

ICCEE follows a holistic approach that moves from a single company perspective to the assessment of the entire cold supply chain. Existing financing schemes for SMEs will be assessed: the optimal ones will support the implementation of energy efficiency measures. ICCEE objectives build on 2 pillars:



The ICCEE project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 847040.